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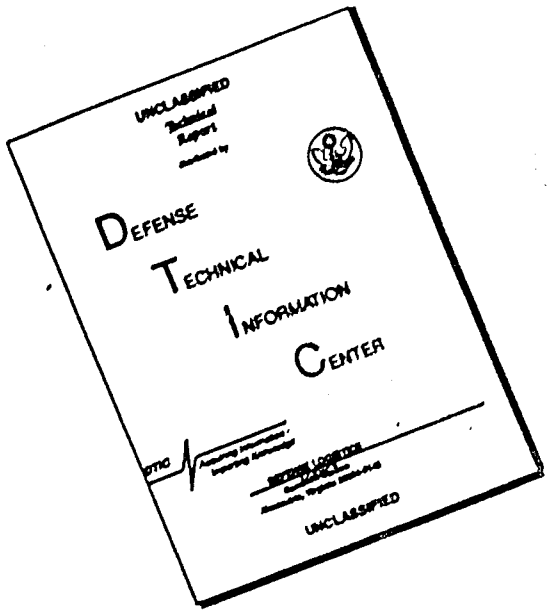

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DEPARTMENT OF THE ARMY
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WASHINGTON, D.C. 20310

IN REPLY REFER TO

AGAM-P (M) (27 Feb 68) FOR OT RD 1 March 1968

SUBJECT: Operational Report - Lessons Learned, Headquarters, 46th Engineer Battalion, Period Ending 31 October 1967

TO: SEE DISTRIBUTION

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2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

Kenneth G. Wickham

KENNETH G. WICKHAM
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DEPARTMENT OF THE ARMY
HEADQUARTERS, 46TH ENGINEER BATTALION
APO 96491

EGBB-CO 1 November 1967

SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for Quarterly Period Ending 31 October 1967

THRU: Commanding Officer, 159th Engineer Group, APO 96491
Commanding General, 20th Engineer Brigade, ATTN: AVBI-OPN APO 96491
Commanding General, US Army Engineer Command Vietnam (Prov), ATTN: AVCC-P&O, APO 96491
Commanding General, United States Army, Vietnam, ATTN: AVGC-DH, APO 96375
Commander in Chief, United States Army, Pacific, ATTN: GPOP-OT, APO 96588

TO: Assistant Chief of Staff for Force Development
Department of the Army (ACSFOR DA)
Washington, D.C. 20310

Section 1, Significant Organization or Unit Activities

1. Command: LTC George B. Gray Jr assumed command of the battalion on 6 September 1967 from LTC William V. McGuinness, Jr.

2. Personnel, Administration, Morale and Discipline:

a. The 46th Engineer Battalion is organized under TO&E 5-116E, 5-117E, and 5-118E effective 12 June 1967, as directed by GO 107, HQ United States Army, Pacific.

b. Vietnamese continue to be employed in a variety of occupations — laborers, carpenters, masons, electricians, etc. The total number of Vietnamese employed remains at approximately 700.

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c. The Vietnamese carpenters went on strike for a 9 day period from 31 August 1967 to 8 September 1967. A Vietnamese Labor Council consisting of elected and selected Vietnamese from each company was organized on 23 September 1967. It has obtained highly satisfactory results. This council has created a better understanding between the Vietnamese and Americans. Many minor misunderstandings have been clarified through these meetings. An awards system for the Vietnamese employees similar to the military awards system is being actively pursued by the Battalion to recognize achievement. The benefits already are evident. The Vietnamese employees have shown a marked improvement in efficiency and productivity. The Vietnamese have asked for cards, badges, etc., which identify their connection with the battalion. In short, esprit of the Vietnamese workers visibly is developing and their value to the Army is increasing apace.

d. Personnel Strength: During the last quarter the battalion strength has dropped from 11% overstrength to 2% under authorized strength.

e. Morale and Welfare: The monsoon season is drawing to a close and morale is increasing with decreasing rains. Some of the contributing factors to increased morale are: a newly completed Battalion Chapel, a new EM/NCO Club, a shower-latrine complex for each company, upgrading and addition to the company and battalion recreational facilities and increased emphasis on the Awards and PIO Programs. Further indications are the 94 extensions of tours, increased re-enlistments and decreasing V.D. rate experienced during the last quarter.

3. Intelligence and Counterintelligence: The battalion has been increasingly involved in construction projects outside of the Long Binh area. The collection, analysis and dissemination of timely intelligence information increasingly is required for planning purposes. The weekly intelligence briefing has been expanded to include all officers and senior NCO's, in addition to the daily intelligence summaries obtained from higher headquarters.

4. Plans, Operations and Training:

a. Headquarters Company. During the last period, Headquarters Company continued to produce potable water in support of various units on Long Binh Post. Headquarters Company produced 486,125 gallons of potalbe water during the last period.

b. Company A. During the past quarter, the Company completed the changeover to the new TO&E 117E. Effective on 1 October 1967, the battalion discontinued Ordnance Direct Support. The new Battalion Maintenance Section began function ing on the same date by performing all annual inspections on Ordnance Equipment and quarterly inspections on selected Engineer items.

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It was evident that the increased workload placed on our Direct Support Unit caused delay in completion of work orders. To date this problem still exists but has been partly alleviated by obtaining authority from our Direct Support Unit to perform limited third echelon work on our own equipment. Ordnance Equipment that had to be evacuated was being processed through the Battalion Maintenance Section. This was found to take too much time and subsequently it was decided line companies would save time by evacuating their own equipment to the DS unit.

On 1 September, all tire PLL's were consolidated in Alpha Company and a battalion tire shop under the direction of the Battalion Maintenance Section was set up. A Vietnamese crew of eight men under the direction of a Private First Class has been running an effective operation. The tire shop operates under the Direct Exchange Concept. The major problem encountered has been the great difficulty in obtaining tires. During a five month period only 46% of all five ton tires obtained were received through supply channels. In order to keep vehicles on the road it has been necessary to obtain tires from any source available.

Under the new TO&E 117E, the Engineer Direct Support Maintenance Section under went a reduction in force. To compensate for this loss we have integrated and trained 4 Vietnamese as mechanics helpers into the section. We intend to integrate four more workers, two at a time for a total of eight. The training of the Vietnamese mechanics has been slow because of the language barrier and it is for this reason that we train and integrate only two workers at a time into the section. During the period 1 September through 26 October, 155 job orders were completed by the engineer Direct Support Maintenance Section. Maximum time for completion of a job was 29 days and the minimum time was 4 hours. Average time for completion of a job order was 3 days.

In an attempt to further improve the 3rd Shop Maintenance capability several combinations of night shifts have been used in the maintenance shop, with varying degrees of success. On complex type jobs we have found it is necessary to overlap the two shifts in order that the second shift knows what has been accomplished and what remains to be accomplished. Occasionally certain jobs can be completed more efficiently by letting the same mechanic work on the job order from beginning to end even though work may be interrupted.

During the months of September and October the 34-E Paver and crew went TDY to Phu Loi with the mission of placing 5 large hangar slabs. At the completion of the project over 2,500 cubic yards of concrete had been placed. Since then the paver has been returned to the Long Binh area to again be used as a permanent type Batch Plant to support self help and construction projects.

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On 1 October, the Quarry Section closed down operations at Long Binh and moved to a better quarry site near Bien Hoa under the operational control of the 103rd Engineer Company. Prior to this move, blast rock had to be hauled to the crusher site at Long Bihn.

During this quarter the equipment platoons asphalt distributors applied peneprime to 258,000 square yards of soil.

c. Company B. During the last quarter, Company B earthmoving platoon has completed the 25,000 square yard Priority IV extension of the Honai Storage facility for the 506th Field Depot. The completion of Priority IV brings the total additional storage area to 100,000 square yards. The 506th is already filling the newly finished pads with supplies.

Work has been completed on the first phase of the MER for the 48th Transportation Group. This phase required the conversion of unstable soil and jungle to 2,800 feet of road and 170,000 square feet of motor pool hardstand, and 170,000 square feet of administration area. Pads were prepared and two latrines, showers and water towers were constructed by 2nd platoon. The 48th now has occupied the area.

A unique officer's club, the "Red Bull Inn", was constructed by the First Construction Platoon. Located on McArthur Loop, the new club consists of two buildings connected by a covered 20 by 20 foot patio. A 68 foot horseshoe-shaped bar was constructed for the club in the B Company Carpenter Shop. The club was completed and now is occupied.

One of the more sophisticated structures on Long Binh Post recently has been completed by the 1st Construction Platoon. The building is a General Officers' Quarters for USARV. The attractive structure measures 28' 8" square, with a screened porch surrounding half the building perimeter. Two bedrooms, two bathrooms, a living and kitchen area separated by a 6 foot bar make this an exceptionally functional structure. This structure was constructed in only 23 days. This accomplishment was made possible by use of prefabricated exterior walls produced by the Battalion Carpenter Shop. The carpenter shop also provided the cabinets and wood trim.

Due to the increased demand for prefabricated timber structures, the B Company Carpenter Shop has moved to a new enlarged facility. This new location offers a greatly expanded storage area for both raw materials and finished products. The work is done in two, new 30 by 200 foot open side building. One significant improvement is that the wall of a building up to 180 ft in length all can be laid out and matched.

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The carpenter shop is unique both in its personnel structure and the variety of items it produces. Under the direction of four members of Company B's Second Platoon, the 143 Vietnamese assigned to the Carpenter Shop have their own organization which allows full utilization of each Vietnamese's talents. The variety of finished products is almost unlimited. With the aid of jigs set on the floor, the Vietnamese carpenters prefab open framed latrines, showers and even billets and administration buildings. Every part of the building, from wall frames to roof trusses, is included in the "prefab package." In addition to buildings, there is a complete cabinet section that produces every conceivable form of cabinetry from window frames to tables. With its new facility, the Carpenter Shop will be able to support construction throughout the entire Long Binh Area.

During the period the Carpenter shop also prefabbed 22 wooden bunkers for the new MACV Headquaters.

In the USARV area, a 20' x 108' two story BEQ was constructed. The building was completely prefabricated in the 46th Engineer Battalion Carpenter Shop, to include the screen louver blocks and siding on the 8' x 12' wall panels.

Work in nearing completion on an EM Club for II Field Forces. The building consists of six 20' x 50' pascoe sheds tied together into one large building. The interior of the building will have plywood paneling with insulation between the steel sheeting and plywood, and it will be completely air conditioned. In addition to the EM Club, a 2000 sq ft Radio Research Building, 6000 sq ft Community Center Building and a 2000 sq ft Battalion Headquarters Building, all composed of pre-engineered Pascoe sheds, are scheduled to be constructed.

While working on the EM Club, the company also constructed a suspended stage cover for the II FFV Amphitheater, using pascoe shed components, and dressing rooms behind the stage.

Many water towers including tanks and necessary plumbing have been erected in the Long Binh and II FFV area by B Company. In the 14th ICC area a 34' steel tower with a 4200 gallon tank was constructed and erected. A Chinook helicopter was used to set the 4200 gallon water tank on the tower. This was the first use of a Chinook to support Engineer effort at Long Binh.

Work was begun during the period on a combat essential road which will eventually link Bearcat with Long Binh. The proposed route begins at Camp Mallard and heads southward to Bearcat across rolling, virgin terrain covered by dense jungle over much of the route. The remainder alternates between high dry and low swampy areas. There are several minor streams and one forty foot stream that must be crossed. The road will be approximately nine miles in length, running through the center of a 200 meter cleared right-of-way. A considerable amount of survey and clearing has already been accomplished and the general path of the road delineated. A new 50 acre laterite pit has been developed to support the consturction. Approximately 1 miles of access road has been constructed to connect the pit and the road trace.

d. C Company. During this quarter Company "C" continued construction of the II Field Forces Aviation Facilities. 143,000 cys of laterite and 37,000 cys of spoil were hauled during this period. A total of 630 ft of culvert was placed to provide drainage. Earthwork for a 420' x 200' motor pool, a 600' x 420' maintenannce area, five 70' x 420' helipad lanes and 2.5 miles of of roadway was completed. Work was begun on the revetments and pads for the first 30 helipads. A 500 man messhall with water tower also was completed during this period.

During this quarter Company "C" completed two 28' x 29' two-bedroom houses to be used as General Officers Quarters and started another GOQ. Each building is completely insulated and air conditioned, with water-borne sewage. Generally, the building are simple and austere. Their attractive appearance results largely from expert GI and Vietnamese workmanship and intelligent use of available materials.

Company "C" completed two trailer courts during the period. One trailer court project consisted of the earthwork for two 30' x 360' and a 640' Cal de sac, blocking and leveling 22 trailers, and installing water and water borne sewage systems, as well as steps and boardwalks for access. The other trailer court consisted of four trailers with the same requirements.

Company "C" constructed twelve reinforced concrete blast walls 20' long, 8' high and battered 12" to 14" thick. One large wall 14' 9" high and with an overall length of 204' also was constructed. The "Great" wall was 16" thick and contained two door ports with baffles.

A combat support mission consisting of reshaping and surfacing a 3900' x 60' landing strip was completed near the end of the period. (After action report is attached). The strip was shaped, crowned and surfaced with two applications of peneprime.

During this period Company "C" constructed and filled 11 each 20' x 40' revetments for helicopters of the II Field Forces Aviation Section. Three each 20' x 40' revetments also constructed for the 12th Aviation Group.

The construction of a Command Officer's Mess began near the end of the quarter. The building is a 50' x 80' mess facility for senior officers. The facility will include dining rooms, bar, kitchen, storage, and scullery areas as well as the cook's living quarters. The dining rooms and bar will be completely insulated and air conditioned. A Cupola was included in the building by installation of 36' span (house) trusses. In design and construction, the building is simple, austere and attractive. Unusual care and workmanship again have resulted in a top grade facility.

e. D Company. During the last quarter, D Company started one of the most challenging horizontal construction projects in the Long Binh area, the Bien Hoa By-Pass. This 2.1 mile hard surfaced road will provide an easy and quick access from the IIFFV area to the Bien Hoa Air Base Complex. To date D Company has hauled and placed 25,800 cu yds of rock, 10,039 cu yds of sand, and 29,000 cu yds of laterite. This road is being constructed over

rice paddies, swamps, and through rubber plantations.

The Saigon POL project consisting 3 each 10,000 bbl and 5 each 3,000 bbl tanks, pumping and tank maniforlds, and associated piping at the My An POL Tank Farm was temporarily delayed during the period awaiting new design. Also included in the project are two submarine pipes in Saigon and two 3,000 bbl storage tanks with a truck fill stand at Newport. During this quarter the submarine pipes were assembled and put in place. The remainder of the project will be continued as final design becomes available.

the HAMCO MER consists of placing three laterite hardstands, three showers, two latrines, and a 3,000 gallon water tank with tower. During this quarter approximately 20,000 cu yds of the required 25,000 cu yds of laterite were placed and compacted. The shower and latrine facilities were completed and the using unit has occupied the MER as construction continues.

The 1920 SF 159th Engr Gp Chapel, featuring rigid frame construction with a 30 foot free span, was the first of a new standard type chapel. The entire interior is paneled. The altar area paneled with grooved plywood. Interior stain was made from a combination of peneprime, diesel, and red paint. Much of the fine finish work w s done by Vietnamese carpenters.

An addition to the USARV BEQ Complex consisting of two 20' x 108' two story buildings containing 8,320 sq ft of living space was constructed during this period.

During this quarter D Company hauled and compacted 3,000 cu yds of laterite while constructing a 200' x 400' parking lot outside of the 90th Replacement Battalion for Long Binh Post. The parking lot was peneprimed and serves as a bus parking area.

During this period D Company received the mission of filling 87,000 sand bags to be used at the new MACV Headquarters in Saigon. In completing this project the main effort was through our Vietnamese employees who filled the 87,000 sand bags at a rate of 3,000 per day.

D Company worked on various other construction projects to include: A Bakery Annex, using a Pascoe building, three shower complexes for the USARV BOQ area, the 46th Engr Bn Block Shop, a Bn Loading ramp, a Company Grease Rack, and the Installation Safety Barriers along the road in front of the Engineer Cantonment area.

There were also a number of smaller horizontal type jobs worked on during this quarter. These jobs included the repair of roads and pads in the Long Binh ASD, repair of the Long Binh Post perimeter road, 46th Engr Bn Area Road Development, and a pad for the 53rd Signal Co.

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5. Logistics: During the past quarter the S-4 section has received and issued on a monthly average 318,000 EB of lumber and 6,000 bags of cement. Most electrical materials are available at this time. However, there is a shortage of large circuit breakers (300 to 500 amp) and load centers (30 to 42 circuits) in depot and most have to be bought from RMK. The battalion is presently short 2 water distributors which are urgently needed with the onset of the dry season. Welding capability is also critical. We are authorized 6 each welding shop cargo trailer mounted, 300 amp DC and have one on hand. The battalion is presently at a 95% fill on critical items of construction materials.

6. Force Development: The organic work force of this battalion is currently augmented by approximately 700 permanent hire Vietnamese. Organization, control and employment of this work force has been reviewed closely during the quarter. Experience in C Company 46th Engineer Battalion has shown that Vietnamese workers best can be utilized in organized work crews with a Vietnamese Chain of Command under Military supervision. Reorganization of the Vietnamese work force is proceeding along this line. The carpenter shop, culvert shop and block shop have been organized as separate functions with overall supervision by a few military members. Speciality trailers and fixed local operations such as mechanics remain integrated in the various units and sections. The bulk of the work force is being reorganized into a "platoon" structure that will add two small vertical "platoons" to each line company. In addition this organization will provide each company with a composite unit of equipment operators and laborers for use on horizontal construction. These Vietnamese "platoons" will be employed on specific tasks or identifiable portions of larger tasks. Vietnamese "platoons" normally will be attached to organic platoons for employment. Supervision and overall control will be furnished by the parent company normally under a platoon leader with Vietnamese jobsite supervision.

7. Command Management: Increasing emphasis has been placed upon advance planning and job management at all levels down to and including platoon level. Each platoon is required to submit to company operations section a simple work plan for each day which includes equipment, personnel and material requirements and work planned for the next day. It has proven its value in reducing wasted effort by increasing the effectiveness of company and battalion support to the platoon tasks. Decentralization of the planning function has created an awareness of job planning at all levels. Also it enables the command structure to serve as a planning review process. Our objective continues to be scheduled planning with detail commensurate with the planning level.

8. Civic Affairs: The battalion civic affairs program has been very diversified this last quarter. Some of the assistance in civic affairs include: hauling fill and leveling a boy scout camp, repair of 10 pumps for wells, teaching English to Vietnamese, sponsoring an orphanage, assisting in the construction of a school and school desks, distribution of: 100 school kits, 1000 bars of soap, 500 pounds of food, 75 pounds of clothes, scrap lumber, fabrication of play ground swings and teeter toters. Most of these projects were accomplished by military personnel in their off duty time.

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Section 2, Part 1 - Observations (Lessons Learned)

1. Personnel - None

2. Operations

a. Item: Sand Blaster (see inclosure)

Discussion: Company "C", 46th Engr Bn is currently constructing a Command Officer's Mess at USARV Headquarters. The design for the building called for a patio enclosed by a stone masonry wall. Normal procedure in this type of construction requires that the final step is to sandblast the wall in order to rid the rock faces of mortar and dirt and provide a high quality finish product. Since sandblasting machines are not organizational to Engineer units and are not readily available in this area, it was necessary to devise a substitute. SP4 Harris of the 2nd Construction Platoon of Company "C", 46th Engr Bn designed and constructed a device which has achieved excellent results.

Observation: The device consists of 2 air hoses from a 600 cfm air compressor tied into a section of 1½" pipe with an intake line for sand attached. The 1½" pipe is a straight section, open at one end with a T-connection at the other end. Each arm of the T connects with an air hose from the 600 cfm compressor. The sand intake consists of a 3/4" pipe which enters the 2" pipe at right angles and has a 90 deg angle inside the main pipe. It is apparent that an apparatus of this type has other uses. One of these is as a high pressure nozzle to spray-clean equipment and buildings. The only modification necessary would be to use water instead of sand.

b. Item: Another Use of Peneprime

Discussion: The construction of the two 30 by 200 foot buildings for the new carpenter shop suggested a new use of peneprime. At the completion of the sub-floor structure, the peneprime section was contacted and the entire sub-structure was shot.

Observation: This process will help guard against termites and deter deterioration of the wood.

c. Item: Construction of "Tilt-ups"

Discussion: An effective way to save time when constructing prefab buildings is to nail all horizontal siding on while the building walls are still laying on the slab. Once the entire wall is completed, it may be lifted into place and anchored.

Observation: This process saves considerable time because of the increased ease of assembly.

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d. Item: Variation of Rock Crushing Method

Discussion: Recently we have been crushing 3" rock to 1" minus. We have found that the most efficient means of doing this is to run the 3" rock directly into the roll crusher. We used the following method of doing this and did not have to move our jaw crusher to accomplish this:

A conveyor was set up perpendicular to a hopper on the roll crusher. A second stationary hopper was built and placed on the ground directly over the end of the conveyor. This hopper had a capacity to hold about 5 cu yds and could easily be filled with the front loader. A control door at the bottom of the hopper is operated by one man.

Observation: By not running the 3" rock through the jaw crusher, wear and tear was reduced on this unit.

e. Item: 75 Ton EAGLE Rock Crusher

Discussion: During the last month our 75 Ton EAGLE Rock Crusher unit has been run a double shift seven days a week. Several observations were made during this period. The first has to do with the screening efficiency and production. According to TM 5-331, the thickness of the bed of material passing over the screen should not exceed four times the screen opening. It has been our experience when crushing to ¼" minus that production can be significantly increased by increasing the thickness of the bed over the prescribed limit. The following tests and results are indicated below.

Quantity	Size of Input	Thickness of Bed	Size of Output	Time
1 hopper	1½"	1"	¼"-	60 min
1 hopper	1½"	2½"	¼"-	25 Min
1 hopper	3/4"-	1"	¼"-	45 Min
1 hopper	3/4"	2½"	¼"-	20 Min

Observation: There did not appear to be any excessive and rapid wear to the crushing unit caused by increasing the bed thickness over the screen.

We have used the following practice in getting the maximum use out of our conveyor belts on our crushing unit. Conveyor belts are only replaced when they break. To replace a conveyor belt that appears to be badly worn we feel is a waste of time. Frequently a belt that appears to be badly worn will last much longer than expected. Using a badly worn belt does not cause excessive wear on the other parts of the machine. We have reduced our downtime by using this practice.

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f. Item: Special Consideration of Earthmoving During Monsoon Season

Discussion: Great difficulty is always encountered by the Earthmoving Platoon during the monsoon season, especially on large pad construction projects, such as supply storage areas. If proper compaction is not acheived immediately after fresh laterite and the area is left "open" to the rain, the damaged area becomes saturated and must be removed and replaced. If this is not done, additional lifts, even though adequately compacted, fail because of the lack of support of the faulty base.

Observation: In order to avoid the extensive loss of man and equipment hours, it has been found most efficient to proceed cautiously by placing thin (3" to 4") lifts in narrow strips, working from one side to the other. Sheepsfoot rollers should be applied immediately and used as extensively as possible. This should be followed by a 13-wheel and/or 50-ton roller for final compaction and sealing of the surface. No area should be worked that cannot be compacted or sealed in about 15 minutes.

g. Item: Stabilizing Large Areas of Silty Mud.

Discussion: One of the most common problems in horizontal construction encountered during the monsoon season is stabilizing large areas of silty mud. The usual requirement is to stabilize an area for troop occupancy or for pad construction.

The experience of the EM Platoonof Company "C" 46th Engr Bn has shown that in this area Approximately 12 to 18 inches of silty material usually must be removed in order to arrive at a firm compactable surface. Where suitable spoil areas exist, the easiest removal method is to use dozers to strip the area, pushing the spoil directly into suitable areas. However, suitable spoil areas are rarely located close enough to the construction site to make this solution tenable. Normally the spoil must be loaded and hauled away from the site. The usual practice is to use front loaders and dump trucks after dozers have piled up the spoil material. All attempts to use 290 scrapers have proven unsuccessful due to the great weight and lack of traction of this type of equipment.

Observation: The use of front loaders is a practical and often used method of removing spoil. However there are certain disadvantages which have led Company "C" to use another method of loading mud. The main disadvantage of the front loader method is the tremendous wear and tear on the front loader caused by the excessive weight of this type of material. Another disadvantage is the fact that a front loader often can not get into the area without becoming stuck.

The solution adopted by Company "C" is the use of the clam shovel attachment to the 20 ton crane. When used in conjunction with one dozer, the crane is just as effective as a front loader. There is no unusual maintenance problem involved in the use of the crane and it need be positioned only one time for a large quantity of spoil. From the standpoints of both economy and production, the use of the clam shell has been found superior to the front loader method of loading spoil material for removal.

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h. Item: LOC Construction over low CBR Soil

Discussion: Due to low soil bearing capacity and high moisture content normal construction practices must be altered. The construction of the Bien Hoa By-Pass during the monsoon season was a significant breakthrough in wet weather horizontal construction. In accomplishing this task several important lessons were learned. The terrain over which the road was to be constructed had a low CBR (.4% to 1.4%) and a high water content (14% to 17%). It was obvious that the normal practice of stripping off the surface humas material could not be done since the aggitation of the soil caused water to rise and the terrain to become quick. Also, equipment working on the soil would break through the humas cap and cause a quick condition. The problem then was to cuild a road over terrain on which equipment could not work. Initial attempts to stabilize this soil were field expedient methods using artillery shell casings, jeep bodies, concrete telephone poles, and hydrated cement. All these methods proved to be unsatisfactory since the lower layers of fill placed over this material could not be properly compacted.

Observation: The answer was to place a free draining sand filter blanket twelve inches thick over the road bed. This filter blanket used in conjunction with deep ditches would not allow the ground water to rise into the base course. In order to maintain vehicle traffic a layer of rock was placed over the sand filter blanket. This combination procedure allowed construction to continue regardless of weather. In fact the rain caused the filter blanket to become very firm.

An additional benefit derived from this practice was that traffic over the filter blanket caused the natural soil to consolidate and later CBR reading indicated a rise from 0.4% to 17.8%. This resulted in a redesign of required base course thickness thereby saving considerable earth work.

Pnuematic tired rollers (50 ton and 35 ton) were used to compact the filter blanket.

Over the filter blanket a base course of laterite was placed. It was compacted with the Sheepsfoot roller and sealed with 35 and 50 ton pneumatic tired rollers. On the finished base course the percentage of compaction ratings were in the range of 85% to 95% and CBR's ranged from 84% to 122%. (Check the figures)

Using the above methods a road suitable for hot mix paving was constructed in 2½ months at the height of the monsoon season.

i. Item: Anchoring columns in billet construction

Discussion: Anchor plates for columns are hard to properly align, without unusual control, an unslightly appearance results.

Observation: Place a 7" piece of 5/8" reinforcing rod imbedded four inches in the concrete and protruding three inches out of the concrete. Then place the column with holes drilled in the bottom to align with the rods in the concrete, over the rods. This offers a stable and attractive anchoring system.

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3. Training and Organization

Item: Local National Labor Organization for a Construction Company

Discussion: Experience in C Company 46th Engineer Battalion revealed that optimum construction output from Vietnamese workers was acheived through organization of separate work units. These units were organized and employed in much the same manner as an organic platoon. They are assigned projects or specific portions of projects and are attached to an organic platoon for operation. Usually one GI is required for overall supervision with detailed job supervision a responsibility of the Vietnamese supervisors.

Observation: This method of organization is more efficient and productive. Lost and wasted time by both military and civilian labor is decreased. Total work output is increased over a comparable number of GI's and Vietnamese organized in a mixed crew. In addition this method of operation develops a greater sense of responsibility and pride in the Vietnamese work force. Furthermore it appears that the average GI's attitude toward the Vietnamese work force is improved under this organization as the Vietnamese are allowed to prove that they are a productive entity. Infact, some evidence of competition between GI and Vietnamese crews employed on the same or similar tasks is becoming evident.

4. Intelligence: None

5. Logistics:

a. Item: Repair Parts

Discussion: Obtaining parts continues to be the problem that it has always been. A study was conducted at this unit of receipts of repair parts for the months of June, July, and August. The survey was made on all requisitions submitted for that period and the disposition of those requests as of the 25th of September 1967. The requisitions were divided into three groups, that is Red Ball; A & B priority; and C & D priority.

Results were as follows:

a. 63% of all RBE orders were not filled.

b. 63% of all A & B priority requisitions were not filled.

c. 71% of all C & D priorities were not filled.

Recently we were visited by a USARV ASL & PLL inspection team. We were advised to compensate for the low percentage of requisitions filled by insuring that requisitions for all required parts are submitted in a timely fashion. Frequently salvaged and fabricated parts were not being placed on requisition. We also were advised by this team to insure that all parts obtained from other sources be recorded on demand data.

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In October for the first time our technical supply direct support unit published a print out with all outstanding requisitions recorded. We were instructed to reconcile our document register with their print out. It was found that about 500 requisitions submitted and recorded by our unit had been lost and not submitted by technical supply. These 500 lost requisitions were immediately rerequisitioned.

Observation: A great deal of command emphasis must be placed on the proper and timely submission of all requisitions and demand data must be recorded by all who obtain parts from other sources. Also, a monthly master print out should be published and distributed to all supported units by the DS technical supply. This would be most helpful in that lost requisitions could be immediately re-requisitioned in a more timely manner.

b. Item: 5 ton Truck Tires

Discussion: Recently this unit experienced a critical shortage of 11.00-20 military type tires (FSN 2610-262-8653). In lieu of this tire, we used 12.00-20 commercial type tread (FSN 2610-269-9554). Our brief experience in three weeks is that the commercial tire lasts longer and is less apt to puncture. There seems to be less tendency for the commercial type tread to trap rocks and sharp objects in the grooves such as sometimes happens with the military type tread. The only difficulty encountered is the tendency of the commercial type tire to slide more readily on wet laterite.

Observation: During the dry season the commercial type tires serve as an excellent substitute for the standard military type tire on improved haul roads.

c. Item: Substitutes for In-Tank Fuel Pumps

Discussion: We have recently had a problem with the in-tank pumps on the 5 ton M52A2 multi-fuel trucks. They wear out rapidly and new ones are difficult to get. To eliminate this problem, we have used fuel transfer pumps and quarter ton fuel pumps in lieu of the required in-tank fuel pumps.

Observation: It has been our experience that they can be easily installed with only slight modifications, and they work equally as well. There seems to be a better supply of these pumps and they wear well over long periods of time. The FSN of the two type pumps used in lieu of in-tanks fuel pumps are as follows:

Transfer Pump	2540-735-4014
Quarter ton Fuel Pump	2910-678-1856

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SUBJECT: Operations Report - Lessons Learned, (RCS CSFOR-65) for Quarterly Period Ending 31 October 1967

Section 2, Part II, Recommendations

1. Personnel:

a. Recommend that a Civic Actions NCO be authorized. Units operating in Vietnam are engaged in Civic Action Projects to help improve the image of the Government of Vietnam and to gain the support of the people. Planning and coordination with Local and Province officials and with military agencies require that at least one NCO or Officer devote his full attention to this activity. Since he must plan and coordinate construction effort from all battalion resources, he should be a member of the S-3 Section. More harm than good will be realized from initiating a project and not following through to successful completion.

b. Recommend that this battalion be authorized a re-enlistment NCO, MOS OCE. A full time re-enlistment NCO is required by higher headquarters, this NCO is drawn from the unit. This creates an unacceptable vacancy in some battalion units.

2. Operations: None

3. Training and Organization: None

4. Intelligence: None

5. Logistics:

a. Recommend that FM Radios authorized by TO&E 5-115E be procured and issued. The dispersion of operational sites from company and battalion headquarters makes radio communication the only method of insuring efficient utilization of resources. At the present time vehicles must be dispatched to effect adjustment of equipment and personnel requirements which develop. In addition personnel now must be sent to isolated jungle work sites in hostile areas with grossly inadequate means of communications. Our inability to communicate greatly impairs our tactical capability; an increasing requirement as we move more and more to operations in areas susceptible to attack.

b. Recommend that three 5,000 gallon water semi-trailers with tractors be authorized. The present authorizations of five 600 gallon water trailers and six 1,000 gallon water distributors are inadequate to meet the needs of a construction battalion in Vietnam. The 600 gallon trailers are of very little use to a unit living in a cantonment area where there is no central water system. Cantonments have developed utilizing water towers and tanks ranging from 600 to 4,200 gallons for mess halls and showers. This requires use of water handling equipment capable of filling up at a well point or erdlator site and pumping to the tower mounted tanks against a head of from 15-35 feet.

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This situation has necessitated the use of water distributors to haul potable water, making them unavailable for job utilization. The high percentage of horizontal work puts a greater demand on water distributors. During the dry season a water distributor is required at each site where earth is hauled. There are often more than six such sites (the number of authorized water distributors) working at one time. The size of the authorized water distributors, 1,000 gallons, requires many trips per day because of the large quantities of water required and the hauling and waiting time to refill the tankers. It is submitted that additional tankers are required to satisfy the requirement for additional water hauling capability and will provide an economic means of transporting the water.

c. Recommend that three additional Dewalt saws and generators be authorized this battalion. The extensive use of wood structures and the large volume of vertical construction make the presently authorized six Dewalt saws inadequate to effectively perform the assigned mission. Added to the construction project load, much of which must be done on the site for non-standard construction, is an enormous quantity of prefabricated and precut structures of standard design which are centrally produced for this unit and the support of units doing self help construction. This Battalion cuts in a central prefabrication shop over 300,000 board feet of lumber monthly.

d. Recommend that a small commercial type farm tractor with backhoe be authorized to each construction company. Two of these machines have been on loan to this battalion for the last year. Our experience with them proves that they are invaluable for construction work. They are in constant use and demand by other units. Many culverts, ditches, and aircraft revetment assignments have been accomplished more quickly and efficiently with their use. In some cases, their size and flexibility have made them the only piece of equipment capable of performing the mission. If the item was standard issue with appropriate parts support, it would realize a great saving in time and manpower.

e. Recommend that a rough terrain 20 ton crane be issued to each construction battalion, in lieu of one of the standard truck mounted 20 ton cranes. The standard crane proves inadequate for the great amount of off-the-road work required of a construction unit in RVN. Furthermore the high flotation design of the RT crane makes it far more versitile in operating over soft soils such as those encountered in RVN.

f. Recommend that a forklift be procured and issued to this Battalion for use in the carpenter shop. At the present time the carpenter shop is not authorized special handling equipment for the off-loading and transporting of lumber of the storage and loading of prefabricated items.

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Under the existing conditions, the great majority of this work is accomplished by manual labor and is not only time consuming but inefficient. The carpenter shop is staffed with 4 GI's and 143 Vietnamese personnel and consumes approximately 75,000 board feet of lumber weekly. The lumber itself is almost entirely 1x and 2x material. An operation of this magnitude, to maintain efficiency requires the use of a forklift truck on a permanent basis.

GEORGE B. GRAY JR
LTC, CE
Commanding

4 Incl
~~1. Organization Chart~~ Withdrawn,
~~2. After Action Report~~ Hqs, DA
3. Vietnamese Organizational Chart
4. Sand Blaster Diagram

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AGB-3 (1 Nov 67) 1st Ind
SUBJECT: Operational Report-Lessons Learned for Quarterly Period Ending 31 October 1967

HA, HQ, 159th Engineer Group, APO 96491 27 NOV 1967

TO: Commanding General, 20th Engineer Brigade, APO 96491

1. Forwarded for your acceptance.

2. This headquarters concurs with the recommendations in the basic correspondence.

FOR THE COMMANDER:

J. K. BUNTYN, JR.
Major, AGC
Adjutant

AVBI-OPN (31 Oct 67) 2nd Ind
SUBJECT: Operational Report - Lessons Learned (RCS-CSFOR-65) for Quarterly Period Ending 31 October 1967

DA, Headquarters, 20th Engineer Brigade, APO 96491, 27 Nov 67

TO: Commanding General, USAECV(P), Attn: AVCC-R&D, APO 96491

1. The subject report submitted by the 46th Engineer Battalion has been reviewed by this Headquarters and is considered comprehensive and of value for documentation and review of the reporting units activities and experiences.

2. This Headquarters concurs with the submitted report, with the following comments:

SECTION 2, PART I

Ref para 2e: 75 Ton Eagle Rock Crusher

Recommend this technique of increasing rock bed thickness be tried and evaluated at other quarries. Should the same results be obtained, a change to the TM would be in order. The use of worn parts of a machine until actual failure is recommended consistant with acceptable losses in efficiency, effects on other parts and as to the effect of acceptable inprogrammed work stoppages. Early detection and replacement requisition is a must.

Ref para 5a:

The responsibility of the customer cannot be de-emphasized in supply channels. However, the fact that our repair parts supply system is "reactive" and is becoming more and more evident. The number of unfilled requisitions are becoming so great within the command that data processing equipment must be used extensively so that all commanders concerned can identify problem areas. Critical evaluation of the "feasibility" rather than "workability" of supply procedures should be initiated at policy levels.

SECTION 2, PART II

Ref para 1a&b:

MTOE's have been submitted for these TO&E changes accepted for standard action by commanders within the command. Some duties, even if they take the majority of an individuals time, are not given throughout the command to warrent TOE changes. These committments must be met by resources within the command.

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AVBI-OPN (31 Oct 67) 2nd Ind
SUBJECT: Operational Report - Lessons Learned (RCS-CSFOR-65) for Quarterly Period Ending 31 October 1967

Ref para 5a: Logistics

Rapid communications between dispersed engineer units are a must for the successful accomplishment of engineer missions in a timely manner. Recommend emphasis be placed on the procurement of these radios.

Ref para 5c: Logistics

This headquarters has forwarded a request for temporary loan of five saws to satisfy this requirement. The unit will receive an issue of three 10" saws to temporarily fill the shortage of 16" saws and in addition, two 16" saws have been authorized on temporary loan for 180 days.

Ref para 5d: Logistics

If required and justified, unit may obtain these items by submitting MTOE request in accordance with AR 310-31.

Ref para 5e: Logistics

If required and justified unit may obtain these items by submitting MTOE request in accordance with AR 310-31.

Ref para 5f: Logistics

Each construction battalion has a special authority at this time for two ea 10,000# rough terrain fork lifts.

FOR THE COMMANDER:

CECIL D. CLARK
Major, CE
Adjutant

COPY FURNISHED
46th Engineer Battalion

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AVCC-P&C (1 Nov 67) 3rd Ind
SUBJECT: Operational Report-Lessons Learned (RCS CSFOR-65) for Quarterly Period Ending 31 October 1967

HEADQUARTERS, UNITED STATES ARMY ENGINEER COMMAND
VIETNAM (PROV), APO 96491 21 DEC 1967

TO: Commanding General, United States Army Vietnam, ATTN: AVHGC-DH, APO 96375

1. The subject report, submitted by the 46th Engineer Battalion, has been reviewed by this headquarters and is considered adequate.

2. Reference item concerning Section II, Part I, paragraph 5c, page 14. Concur except as follows: Units will be advised not to make unauthorized modifications to existing equipment, and to submit Equipment Improvement Reports if the performance of the standard fuel pumps is unsatisfactory.

FOR THE COMMANDER:

RICHARD B. BIRD
Captain, AGC
Assistant Adjutant General

Cys Furn:
CG, 20th Engr Bde
CO, 159th Engr Gp
CO, 46th Engr Bn

"THIS PROTECTIVE MARKING IS CANCELLED ON 1 JAN 70"

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AVHGC-DST (1 Nov 67) 4th Ind
SUBJECT: Operational Report - Lessons Learned (RCS CSFOR-65) for Quarterly Period Ending 31 October 1967

HEADQUARTERS, UNITED STATES ARMY VIETNAM, APO San Francisco 96375 22 JAN 1968

TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT, APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned for the period ending 31 October 1967 from Headquarters, 46th Engineer Battalion (CWWA) as indorsed.

2. Pertinent comments follow:

a. Reference item concerning personnel, page 15, paragraph 1. The establishment of full time career counselor positions at battalion and comparable level would greatly enhance the reenlistment efforts throughout the Army. However, it must be recognized that approval of battalion career counselor spaces by DA would require an additional 262 authorized personnel throughout USARV. Since USARV is required to operate under a troop ceiling imposed by the Secretary of Defense and because of the pressing demand for additional combat and combat support units, the diversion of 262 spaces for this program is not feasible at this time. Implementation of this program on a limited basis would be possible if the USARV force structure ceiling were raised. The above comment also applies to the suggestion regarding civic action noncommissioned officers.

b. Reference item concerning FM radios, page 15, paragraph 5a; and 2d Indorsement: Concur. The AN/VRC-12 family of radios are in short supply. The 1st Logistical Command has been instructed to give priority to the conversion of Engineer units upon receipt of new radios.

c. Reference item concerning 5,000 gallon water semi-trailers, page 15, paragraph 5b. This headquarters has forwarded MTOE for all Engineer units. No modification may be made until an approved authorization document is returned from DA. Water systems are presently being installed in the Long Binh area. Once installed, the requirement for water trailers should diminish. If the need continues after installation, recommend a request for loan of equipment be submitted under the provision of paragraph 22e, AR 310-34.

3. A copy of this indorsement will be furnished to the reporting unit through channels.

FOR THE COMMANDER:

Joseph J. Murphy

JOHN V. GETCHELL
Captain, AGC
Assistant Adjutant General

cy furn:
HQ, 46th Engr Bn
HQ, USAECV (P)

PROTECTIVE MARKING WILL BE CANCELLED 21 Jan 69

GPOP-DT(1 Nov 67) 5th Ind
SUBJECT: Operational Report for the Quarterly Period Ending 31 October 1967 from HQ 46th Engr Bn (UIC: WCWWAA) (RCS CSFOR-65)

HQ, US ARMY, PACIFIC, APO San Francisco 96558 16 FEB 1968

TO: Assistant Chief of Staff for Force Development, Department of the Army, Washington, D. C. 20310

This headquarters has evaluated subject report and forwarding indorsements and concurs in the report as indorsed.

FOR THE COMMANDER IN CHIEF:

K. F. OSBOURN
MAJ, AGC
Asst AG

VN 1st Const
16
3 Headmen H6
12 Carpenters V6
6 Electricians V6
6 Plumbers V6
6 Masons V6
15 Laborers V2
1 Tool Room Keeper V3
2 Asst. Tool Rm Keeper V2
VN 2nd Const
16
3 Headmen H6
12 Carpenters V6
6 Electricians V6
6 Plumbers V6
6 Masons V6
15 Laborers V2
1 Tool Room Keeper V3
2 Asst. Tool Rm Keeper V2
VN EM
12
3 Headmen H2
1 Tool Room Keeper V3
2 Asst. Tool Rm Keeper V2
18 Laborers V2
HQ Section
H6
1 Headman H6
1 Interpreter V6
4 Mechanics V6
1 Welder V5
1 Secretary V3
1 Tool Rm Keeper V3
2 Laborers V2
Q-6

INCLOSURE #3

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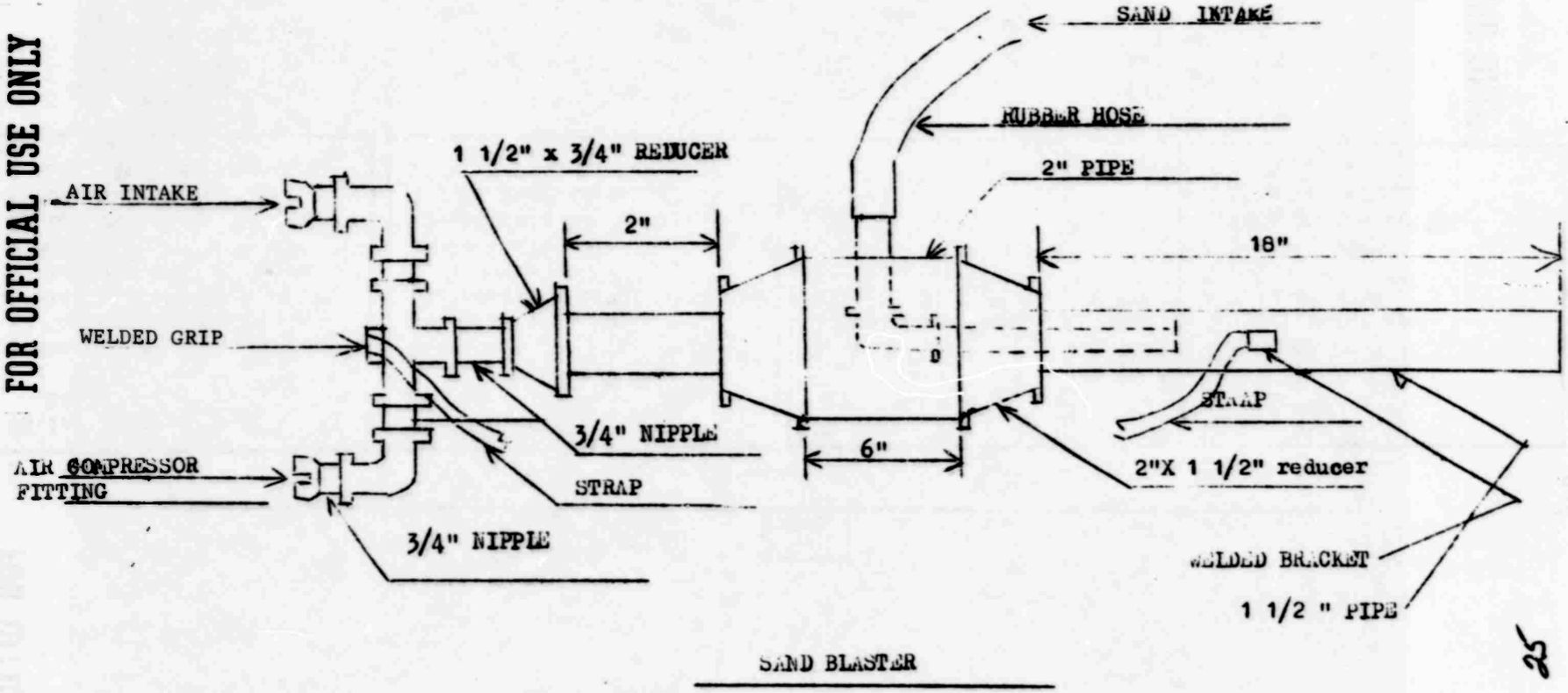

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CO, 46th Engineer Battalion

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